

Abstract

We studied how growing-season applied soybean oil influences at-harvest and postharvest behavior of 'Golden Delicious' and 'Gala' apples. Three single treatments (midseason = soy 1, 21 days before harvest = soy2, 3 days before harvest = soy3) of soybean oil emulsion (1% food grade oil, emulsified with 0.1% Latrine; v/v) were administered to apple trees grown in two different locations in Washington state, USA. Apples were harvested at commercial maturity and stored for up to 6 months at 0.5 °C in air (RA) or under 2% O₂ and 0.2% CO₂ controlled atmosphere storage (CA). In addition to common maturity indices, respiration rate, ethylene evolution, internal ethylene concentration, volatile aroma emission, Flavor regeneration capacity and peel fatty acid distribution were determined. Changes in surface wax structure and weight loss in storage and during shelf-life were evaluated. Phytotoxicity and/or reduced fruit growth was not observed. Nor were any fruit-finish problems attributed to oil application. Fruit firmness, titratable acidity, soluble solids content, peel tissue fatty acid distribution and flavor regeneration capacity were unaffected by the soybean oil treatment. 'Golden Delicious' apples treated with soy2 emitted more aldehydes (mainly hexagonal), while soy3 treated fruit produced more esters. Orchard location influenced fruit response to oil application, as apples grown in the warmer climate (Yakima) has a more intense response. The overall amount of volatiles emitted was similar between growing regions, but fruit from Pullman had higher alcohol and ester emission rates after CA storage, while Yakima grown fruit had higher alcohol and ester regeneration capacities. 'Gala' apples treated with soy 1 had significantly higher alcohol precursor levels when compared to untreated fruit. Weight loss during storage and a subsequent shelf-life period was substantially reduced in oil-treated apples. The surface of untreated 'Golden Delicious' fruit from Pullman had deep cracks compared to a smooth appearance after oil treatment. Delayed degreasing of 'Golden Delicious' apples from both locations after soy 1 and soy2 treatment was observed.